

CLAIMS

1. A tire for a vehicle, the tire comprising:

a body having an innerliner;

a patch attached to the body;

an electronic monitoring device having at least one sensor for sensing a condition of the tire; and

attaching means for removably attaching the electronic monitoring device to the patch.

2. The tire of claim 1, wherein the patch is mounted to the innerliner and the electronic monitoring device is mounted to the patch.

3. The tire of claim 2, wherein the patch includes a body defining a cavity and the electronic monitoring device being at least partially disposed in the cavity.

4. The tire of claim 3, wherein the attaching means includes a locking pin holding the electronic monitoring device in the cavity.

5. The tire of claim 3, wherein the attaching means includes an insert connected to the patch; the insert holding the electronic monitoring device in the cavity.

6. The tire of claim 5, wherein the attaching means further includes a locking pin holding the insert in the cavity.

5 7. The tire of claim 5, wherein the attaching means includes threads on the patch extending into the cavity and threads on the insert; and the insert being threaded into the cavity to hold the electronic monitoring device in the cavity.

10 8. The tire of claim 2, wherein the attaching means includes threads on the patch and threads on the monitoring device; the monitoring device being threaded to the patch.

15 9. The tire of claim 2, wherein the attaching means includes a tab extending from one of the patch and the electronic monitoring device and an opening disposed in the other of the patch and the electronic monitoring device; the tab and opening cooperating to hold the electronic monitoring device to the patch.

10. The tire of claim 9, wherein the tab is adapted to slide and then rotate with respect to the opening.

20 11. The tire of claim 2, further comprising a layer of rubber disposed between the patch and the innerliner.

12. The tire of claim 2, wherein the attaching means includes a threaded connector.

13. The tire of claim 12, wherein the threaded connector is disposed between the patch and the electronic monitoring device.

14. The tire of claim 2, wherein the electronic monitoring device is mounted to the patch by a device at least partially disposed over the electronic monitoring device.

15. The tire of claim 1, wherein the attaching means permits the electronic monitoring device to be reattached to the patch after being removed from the patch.

16. A tire for a vehicle, the tire comprising:

- a tire having a body with an innerliner;
- a substrate attached to the body;
- an electronic monitoring device having at least one sensor; and
- the electronic monitoring device being removably and reattachably mounted to the substrate.

17. The tire of claim 16, wherein the substrate is mounted to the innerliner and the electronic monitoring device is mounted to the substrate.

18. The tire of claim 17, wherein the substrate includes a body having a cavity and the electronic monitoring device is at least partially disposed in the cavity when the electronic monitoring device is attached to the substrate.

19. The tire of claim 18, further comprising a locking pin connected to the substrate; the locking pin holding the electronic monitoring device at least partially in the cavity.

20. The tire of claim 17, further comprising an insert disposed in the cavity; the insert holding the electronic monitoring device in the cavity.

21. The tire of claim 20, further comprising a locking pin holding the insert in the cavity.

22. The tire of claim 20, further comprising threads on the insert and threads on the substrate extending into the cavity; the insert being threaded into the cavity.

23. The tire of claim 16, further comprising threads on the electronic monitoring device and threads on the substrate; the electronic monitoring device being threaded to the substrate.

5 24. The tire of claim 16, further comprising an opening defined by one of the electronic monitoring device and the substrate and a tab extending from the other of the electronic monitoring device and the substrate; the tab being received in the opening to hold the electronic monitoring device on the substrate.

10 25. The tire of claim 16, further comprising a layer of bonding material disposed between the substrate and the body of the tire.

26. The tire of claim 25, wherein the bonding layer is a dual cure rubber.

15 27. The tire of claim 16, wherein the electronic monitoring device is held to the substrate by a device that is at least partially disposed over the electronic monitoring device.

20 28. A device for monitoring at least one condition of a pneumatic tire; the pneumatic tire defining chamber that is pressurized when the tire is mounted to a rim; the pneumatic tire having an inner surface; the device comprising:

a first sensor;

a mount adapted to mount the sensor to the tire;

attaching means for removably attaching the sensor to the mount.

29. The device of claim 28, wherein the first sensor is connected to a housing;  
the attaching means removably attaching the housing to the mount.

30. The device of claim 29, wherein the housing includes an encapsulation material.

31. The device of claim 30, wherein the attaching means includes threads.

32. The device of claim 30, wherein the attaching means includes a pin.

33. The device of claim 30, wherein the attaching means includes an opening and a tab wherein the tab slides and rotates with respect to the opening.

34. The device of claim 29, wherein the housing is directly connected to the mount.

35. The device of claim 34, wherein the mount is a patch adapted to be connected to the inner surface of the tire.

36. The device of claim 35, wherein the patch is fabricated from rubber.

37. The device of claim 36, further comprising a bonding layer attached to the patch; the bonding layer adapted to connect the patch to the inner surface of the tire.

38. The device of claim 37, wherein the bonding layer is a dual cure rubber material.

39. An electronic monitoring assembly adapted to monitor at least one condition of a tire; the assembly comprising:

a patch adapted to be connected to the tire;

an electronic monitoring device having at least one sensor; and

the electronic monitoring device being removably and reattachably connected to the patch.

40. The assembly of claim 39, wherein the electronic monitoring device is threaded to the patch.

41. The assembly of claim 39, wherein the electronic monitoring device is held to the patch with a pin.

42. The assembly of claim 39, further comprising:

slots defined by on one of the electronic monitoring device and the patch;

and

a tab extending from the other of the electronic monitoring device and the

patch;

the tab being received in the slot to hold the electronic monitoring device on the patch.

43. The assembly of claim 42, wherein the slot is configured to require the tab to slide and rotate in the slot in order to connect the electronic monitoring device to the patch.

44. An electronic monitoring device assembly adapted to monitor at least one condition of a tire; the assembly comprising:

a patch adapted to be connected to the tire;

an electronic monitoring device having at least one sensor;

one of the electronic monitoring device and the patch defining at least one opening;

the other of the electronic monitoring device and the patch defining a tab;

the tab being received in the slot to removably and reattachably connect the electronic monitoring device to the patch.



45. The monitoring device of claim 44, wherein the opening is configured to require the tab is slide and rotate with respect to the opening.

46. The monitoring device of claim 44, wherein the patch is a flexible rubber patch.

47. The monitoring device of claim 46, wherein the sensor is disposed in a rigid housing.